Exhibit 3

Transcript of Dr. Jonathan Mattingly

Date: September 27, 2024
Case: Pierce, et al. -v- The North Carolina State Board of Elections, et al.

WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

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1         IN THE UNITED STATES DISTRICT COURT

2      IN THE EASTERN DISTRICT OF NORTH CAROLINA

3                EASTERN DIVISION

4    ------------------------------------------------X

5    RODNEY D. PIERCE AND
     MOSES MATTHEWS,
6                    Plaintiffs,

7                    CASE.: 4:23-CV-00193-D

8         -against-

9

10   THE NORTH CAROLINA STATE BOARD
     OF ELECTIONS, et al.,
11                   Defendants.

12   ------------------------------------------------X

13

14                DEPOSITION OF

15            DR. JONATHAN MATTINGLY

16             NEW YORK, NEW YORK

17              September 27, 2024

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19   REPORTED BY:  KIARA MILLER

20   FILE NO.:  553256

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6                    Plaintiffs,

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8         -against-

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10   THE NORTH CAROLINA STATE BOARD
     OF ELECTIONS, et al.,
11                   Defendants.

12   ------------------------------------------------X

13

14       Deposition of DR. JONATHAN MATTINGLY, taken on

15       behalf of PLAINTIFFS, at 250 West 55th Street,

16       New York, New York, commencing at 10:00 a.m.,

17       September 27, 2024, before Kiara Miller.

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1    A P P E A R A N C E S:

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1 DR. JONATHAN MATTINGLY, after having first been duly

2 sworn by a Notary Public of the State of New York,

3 was examined and testified as follows:

4   COURT REPORTER: Please state your

5   name and address for the record.

6   THE WITNESS: My name is Jonathan

7   Christopher Mattingly. And my address

8   is 304 East Gear Street, Durham,

9   North Carolina 27701.

10 EXAMINATION BY

11 MR. STRACH:

12   Q Good morning.

13   **A Hi.**

14   Q Dr. Mattingly, good to see you again.

15 We've spent some time together over the

16 years. And good to see you, Elizabeth.

17   So today we're taking your deposition in

18 a case styled as Pierce et al., versus State

19 Board of Elections, are you aware of that?

20   **A I believe so. I actually forget the**

21   **whole name, but Pierce is correct.**

22   Q Pierce is right. Okay, good.

23   And you gave your name to the court

24 reporter.

25   Have you ever gone by any other name?

5

1 A   I have not.
2 Q   Okay. The address you gave the court
3 reporter, is that your current address?
4 A   That's my current permanent address.
5 Q   And you're in New York City, tell me
6 what you're up in New York City for, other
7 than this deposition?
8 A   I'm on sabbatical visiting NYU.
9 Q   From Duke?
10 A   From Duke, that's right.
11 Q   And when did it start and when will it
12 end?
13 A   Started the sabbatical or my stay in New
14 York?
15 Q   The sabbatical.
16 A   The sabbatical started I think beginning
17 of fiscal year, so July 1st 2024 and will end
18 June 31, 2025.
19 Q   Of next year, okay, all right?
20 A   But I'm not the CPA. I'm not the -- I
21 don't know exactly legally, but that's my
22 recollection.
23 Q   Gotcha. You may be aware this case is
24 going to trial in February of next year?
25 A   That's correct.

6

1 Q   So will you be able to come down to
2 Raleigh --
3 A   Yes, I will. I'm actually returning
4 regularly to North Carolina. I'll be, yeah, I
5 go off and on.
6 Q   All right. I know you've been deposed
7 before, but I'm trying to remember, have you
8 been deposed in the last two years?
9 A   That's a trick question. I don't
10 remember.
11 Q   So '22 to '24?
12 A   Have I been deposed in the last
13 two years, my guess would be yes, but I could
14 be wrong. Maybe not. I think it was your
15 firm who last deposed me. So you will
16 remember better when that was.
17 Q   So you know the rules. So you're under
18 oath today. To make the court reporter's
19 life easier, try not talking over each other.
20 I'll get the question out, you answer and
21 I'll try not to interrupt you.
22   If there's something you don't
23 understand about a question, let me know;
24 cause I'm not perfect, so I can ask dumb
25 questions sometimes, so let me know if you

7

1 think it's confusing.
2   If you need to take break, obviously,
3 let us know, we'll take a break.
4   Is there anything medication wise or
5 anything that would prevent you from
6 answering questions completely today?
7 A   Not to my knowledge, no, no. Sorry
8 we're very far apart from each other today.
9 Q   You will have to speak up, we are good
10 ways away from each other in this room?
11 A   I will.
12 Q   You were retained by the plaintiff's in
13 this case as an expert; is that right?
14 A   Yes.
15 Q   Who retained you in particular?
16 A   Elizabeth Theodore.
17 Q   With the law firm of Arnold Porter?
18 A   Yes.
19 Q   Do you recall when you were first
20 retained for the Pierce case?
21 A   I believe they first reached out to me
22 in spring of this year.
23 Q   Of 2024?
24 A   Correct.
25 Q   Okay. Do you recall which specific

8

1 districts are being challenged in this case?
2 A   To be honest, I'm not really privy to
3 all those details of the case. I was really
4 asked to evaluate some things about how an
5 algorithm I had written behaved in certain
6 cases, so I actually don't know.
7 Q   All right. What were you asked to
8 provide an expert opinion on, in this case?
9 A   I was asked to run a piece of software
10 that my group had written that implemented
11 the procedure outlawed in a couple of court
12 cases, I'll refer to as Stevenson, and how
13 that algorithm behaved under various
14 situations.
15 Q   When you say your group, who's in your
16 group?
17 A   It fluctuates over time. It's just a
18 number of people at Duke who write papers
19 with me.
20 Q   Are they professors, students, who?
21 A   A mixture of the two and post docs, who
22 are actually essentially professors.
23 Q   Are there any names you can recall right
24 now that helped you in particular with this
25 project?

9

1 A Yeah, as stated in my report. Gregory
2 Herschlag.
3 Q And Mr. Herschlag is he at Duke also?
4 A Dr. Herschlag, he's an associate
5 professor at Duke.
6 Q At Duke, okay.
7 And what specifically was his role in
8 helping you formulate the opinions that you
9 gave in this case?
10 A He did some of the data processing and
11 some of the data manipulation and assisted
12 with running some of the runs of the
13 algorithm, but we discussed everything and...
14 Q Did he help you develop the actual
15 algorithm itself?
16 A Yes. Yeah, we really just implemented
17 the algorithm that the Court laid out and
18 that was written in a paper that we wrote in,
19 2000 -- I don't remember when we wrote it, it
20 was finally published in 2019, but I can
21 double check that if it's important.
22 Q What's your rate of compensation in this
23 case?
24 A I think $400 an hour.
25 Q Okay. All right.

10

1 Do you know what fields you're being
2 offered as an expert in?
3 A I don't know exactly what will be
4 submitted to the court. I mean, I was asked
5 to give my, give my understanding of what the
6 algorithm that we wrote would output in
7 certain -- in various cases. That was really
8 the scope of my report.
9 Q Right. Do you consider yourself an
10 expert in redistricting?
11 A That's a very -- I would probably say
12 no. Yes, in certain parts of it and other
13 parts of it, no. In this case, I was really
14 asked to talk about this algorithm.
15 Q Do you consider yourself an expert
16 regarding census data?
17 A I use census data in my work. It's not
18 my primary field of study.
19 Q Do you consider yourself an expert on
20 the Voting Rights Act?
21 A No.
22 Q Do you consider yourself an expert in
23 mathematics?
24 A Parts of mathematics.
25 Q Which parts?

11

1 A I -- the problem is if I give a very
2 large statement. I mean, I'm particularly an
3 expert in stochastic analysis. Random
4 dynamical systems. Random algorithms. Fluid
5 mechanics. Approximate basing calculations.
6 Kind of applied mathematical biology. Some
7 corners of mathematical biology. I'm sure
8 there's something I forgot.
9 Q Do you consider yourself an expert in
10 statics in particular?
11 A Certain parts of statistics I'm only
12 knowledgable in.
13 Q Which parts are those?
14 A The parts I just mentioned.
15 Q Okay. Do you consider yourself an
16 expert in coding software called Python?
17 A I think I have -- I'm very competent in
18 it, I don't know quite where I fit the bar to
19 be an expert in Python. I'm a very heavy
20 user.
21 Q Did you use Python in any of your work
22 with this case?
23 A Yes.
24 Q In what way, in general, I have very
25 little knowledge of Python?

12

1 A On this particular algorithm, this
2 instance of it was written in Python and all
3 of the graphical output, I think all of it,
4 was generated in Python, at least a large
5 amount of it was done in Python. Python was
6 used for the data cleaning although maybe
7 there was some data cleaning done in Julia.
8 Q And what's Julia?
9 A Julia is another programming language.
10 Q Is there any particular reason why you
11 used Python for this project?
12 A It was the language we had already
13 written, the algorithm we released publicly
14 in 2019.
15 Q Okay.
16 A And Python is particularly good at
17 cleaning data.
18 Q Okay. Good. All right.
19 So today we're going to primarily go
20 through your two reports, do you recall
21 submitting two reports in this case?
22 A Yes.
23 Q Okay. And so we're going to go through
24 those. And promise not going to be long. I
25 thought it could be longer, but as it turns

13

1 out it's not going to be that long.
2 Elizabeth will know more about that than I
3 do. All right.
4   So we're a long ways from each other.
5   (Whereupon, Expert Report of Dr.
6   Jonathan Mattingly was marked as
7   Exhibit 1 for identification as
8   of this date.)
9   (Whereupon, Rebuttal Expert
10   Report of Dr. Jonathan Mattingly
11   was marked as Exhibit 2 for
12   identification as of this date.)
13 Q   We've marked those as 1 and 2. If you
14 look at Exhibit 1, Dr. Mattingly. I don't
15 see a date anywhere in here, although I could
16 be wrong, but do you recall submitting this
17 on or around May 31 of this year?
18 A   I think if you look on the last page, my
19 bet is that it's on the last page, but let's
20 double check.
21   Yes. Executed May 31, 2000 -- It's on
22 the very last page. I apologize, the pages
23 somehow are not numbered.
24 Q   What page are you looking at?
25 A   That's exactly the point. They're not

14

1 numbered unfortunately, I apologize. If you
2 look halfway through the next page where
3 Appendix 1 starts, it's the last page before
4 Appendix 1.
5   Do you mind if I just write numbers on
6 them for our benefit right now?
7 Q   Yeah, fine with me.
8 A   It may simplify our conversations.
9 Q   Oh, I see. All right. So you submitted
10 this report on May 31, correct?
11 A   Correct.
12   That's Page 10, by the way.
13 Q   Are you aware that you had until July 16
14 to actually submit this report?
15 A   I was not aware.
16 Q   Okay. So you submitted this on May 31,
17 but then did not update it in any way before
18 July 16th?
19 A   I submitted the report you have in front
20 of me, that's all I submitted until I
21 submitted this rebuttal report.
22 Q   And then you submitted the rebuttal
23 report and put the date at the top as
24 August 30?
25 A   Yes. I believe that's correct.

15

1 Q   So in drafting either one of these
2 reports Exhibits 1 and Exhibit 2, did you
3 rely on any sources other than those
4 identified in the report and the appendices?
5 A   I'm not quite sure what you mean by
6 sources. I mean, I'm sure I looked up code
7 that I had written previously or how to do
8 something in Python, but I mean, I would say,
9 I mean, there's also quotes from the reports
10 from cases and things like that in here.
11   But I don't, as I understand what you
12 mean by sources, the answer is no, but I'm
13 not 100 percent sure.
14 Q   Okay. all right.
15   And do you intend to offer any expert
16 opinions in this case other than what are
17 offered in these two reports?
18 A   I don't believe so.
19 Q   Okay. And your CV was attached to the
20 May 31 report, correct?
21 A   Yes. I see it at the end.
22 Q   Is there anything that should be updated
23 as of today on the CV?
24 A   I don't think there is anything
25 substantive to this proceeding.

16

1 Q   Okay.
2 A   I am constantly giving talks and
3 visiting. For instance, NYU is not listed as
4 current academic position, visiting academic
5 position, but if you ask me for a copy today,
6 it would have that on it.
7 Q   Okay. Are any of the lectures that you
8 give at NYU related to redistricting?
9 A   I have not given one yet. There's a
10 chance that I may give one in the future
11 about the mathematical aspects of my work.
12 Q   Okay. And it looks like on the second
13 page of your CV it lists prior services as an
14 expert, Harper V Moore, et cetera.
15   Do you see that?
16 A   Yes.
17 Q   Are there any other cases that should be
18 added to that?
19 A   I don't think there's anything that's,
20 that I filed with the court at the moment. I
21 don't think there's anything that's been
22 filed that I've, no.
23 Q   Okay. So there may be cases that you
24 haven't submitted a report yet?
25 A   That's correct.

17

1 Q That you may be involved in?
2 A Yes.
3 Q Have any of these courts, many of which
4 are North Carolina, but not all, have they
5 ever excluded any of your opinions?
6 A Not to my knowledge.
7 Q All right. Have they ever denied credit
8 or given weight to any of your opinions?
9 A Not to my knowledge.
10 Q The Diamond V. Torres case, what's the
11 nature of that case?
12 A I'm a little worried about why that's
13 there. I'm trying to remember what that was
14 at all actually. To be honest, I was looking
15 at that myself and I was trying to remember
16 why that's there. I'm worried that might be
17 a typo. Copied from something, but I don't
18 actually remember right now. I'd have to go
19 look it up, presumably these are in
20 alphabetical order, historical order, so you
21 picked the oldest one.
22 Q It looks like this was the filed in
23 2017, probably?
24 A Yeah.
25 Q Okay. So Dr. Mattingly, do you have any

18

1 experience actually drawing the districting
2 maps?
3 A Would you clarify your question.
4 Q So outside of using algorithms, have you
5 ever sat down and used, let's say Maptitude
6 to actually draw districts in any map?
7 A A few times I've drawn a district to
8 start it for an initial condition for a run,
9 other than things like that or for a
10 demonstration in a class.
11 Q To the extent you've ever drawn
12 districts, have you used Maptitude or some
13 other software?
14 A I've never used Maptitude.
15 Q All right.
16 A I think I may have used data districting
17 early on, but most often I just do it
18 directly in Python.
19 Q Have you ever been asked to draw maps
20 for a government entity?
21 A At various times the court I believe
22 requested me to draw maps to give opinions on
23 various things.
24 Q Right. But have you ever been hired by
25 a municipality, a state, et cetera, to draw

19

1 maps?
2 A No.
3 Q And so outside of your work as an
4 expert, have you ever been engaged by a
5 private group or individual to draw maps?
6 A No.
7 Q The North Carolina legislature in 2023,
8 drew new maps, which are the subject of this
9 litigation, do you recall that?
10 A Yes.
11 Q All right. In connection with that
12 process, did you proposed any maps?
13 A No.
14 Q Okay. In 2023, did you contact any
15 legislatures, republican or democrat, about
16 the maps?
17 A Oh, that's a good question. There may
18 have been a chance at some point, in some
19 portal I put something in about us wishing
20 that they would study the effects of the maps
21 they drew, or something like that, but I
22 didn't propose any particular map.
23 Q Outside of any writings that you may
24 have made, articles, et cetera, did you ever
25 get on a phone call with a North Carolina

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1 legislator?
2 A I've certainly talked with people in the
3 legislature who contacted me about questions
4 about things, yes, but I've never called them
5 to give them an opinion about a map, if
6 that's what you're asking me.
7 Q Do you recall who from the legislatures
8 has called you in the past?
9 A I think -- I'm really bad with names.
10 So if I have to think, I'm sorry.
11 Q That's all right.
12 A At various times -- what's her name who
13 ran, she's -- I mean, at various times, I'm
14 sorry I'm really drawing a blank on some
15 names right now. I think somebody -- I gave
16 once a talk explaining this -- this piece of
17 software once to people and there were people
18 on the phone. I can't remember his name
19 right now. I think Dan Blue might have been
20 there. The person who I'm really trying to
21 remember, what's her name, anyway she's a
22 state Senator.
23 Q Do you remember talkings with somebody
24 named Pricey Harrison?
25 A No. I don't.

21

1 I talk to people when I run into them at
2 various things, right.
3 There was definitely a time when I went
4 to watch the drawing of the maps when they
5 had those late night session in the
6 legislature. I went over just to watch and I
7 talked to many legislatures or they
8 introduced themselves from both parties and
9 chatted with them.
10 Q Was that in 2019 where they had the
11 committee room open --
12 A Exactly, yeah, for sure.
13 Q Did you ever talk to a fellow by the
14 name of Robert Reeves?
15 A I don't believe so, but as I said, I
16 really lose names quickly, to the best of my
17 recollection, no.
18 Q Okay. What about Natasha Marcus?
19 A Oh, there's actually one other thing I
20 should mention. I did talk to some
21 federal -- the office of one of our
22 representatives about analyzing maps,
23 congressional maps across the country.
24 Again, what's his name? I think he's
25 District 13 right now, the one who's not

22

1 standing for reelection.
2 Q Jeff Jackson?
3 A No. Not Jeff Jackson. Maybe it's not
4 13. It's...
5 Q Oh, was it Wiley Nickels?
6 A Yes, Wiley Nickels. Yes, I never talked
7 to him. I've talked to some people from his
8 office.
9 Q All right. Did you ever talk to a lady
10 by the name of Lisa Grafstein?
11 A Not to my recollection.
12 Q Okay. All right. We will -- I'm going
13 to hand you an article that you wrote. I'm
14 going to ask you just a few questions about
15 that.
16 A Sure.
17 (Whereupon, Article "Quantifying
18 Gerrymandering" was marked as
19 Exhibit 3 for identification as
20 of this date.)
21 Q So this is Exhibit 3, Dr. Mattingly.
22 Do you recognize this article?
23 A This is a post from our blog I believe,
24 from our online blog.
25 Q And did you author this?

23

1 A Along with Greg Herschlag.
2 Q Okay. And my read of this article is
3 that your contention was that the maps
4 introduced in 2023 were, "Gerrymandered along
5 part of the lines"?
6 A I think the article is about them being
7 less responsive. And gerrymandering, that's
8 true.
9 Q Okay.
10 A But particularly less responsive I think
11 was the thrust of this article.
12 Q And you were saying they were less
13 responsive than the maps from 2021?
14 A Okay. This was a little while ago. I'd
15 have to look and see exactly. Can I just
16 take a moment to look over this?
17 Q Yes, please.
18 A Okay. What was your question, again?
19 Q Correct me if I'm wrong, I think this
20 article, blog, post, whatever, is focused on
21 the congressional map that was proposed
22 in 2023; is that right?
23 A It seems to both have congressional at
24 the beginning, and the last two sections, one
25 seems to be state house and one seems to be

24

1 state senate.
2 Q Okay.
3 A Because one of them is 120 seats and one
4 of them has on the order of 50.
5 Q All right. And at least with regard to
6 the congressional map that was proposed
7 in 2023, it looks to me like you're comparing
8 it to the court ordered 2022 map?
9 A I think what we're comparing it to is
10 the map used in the elections, in the
11 previous elections.
12 Q Right. Which would have been a 2022
13 map?
14 A Right. We're using -- comparing it to
15 the one that was proposed for the next
16 elections to the one that was used in the
17 previous election.
18 Q All right. And you understand that
19 the 2022 map, which was used in 2022
20 elections, was drawn by the court's special
21 masters?
22 A At least in the part, yes.
23 Q Okay. Did you make any attempt to
24 compare the 2023 proposed congressional map
25 to the map that was enacted in 2021?

25

1 A   The map that was used in 2021? I mean,
2 it wasn't used, right?
3 Q   That's right.
4 A   I mean, I don't -- I don't believe.
5 It's a little hard because these are actually
6 movies that you have there. These plots are
7 movies and the movies, I can't run them on
8 the paper. So I can't quite see what all
9 those labels are.
10   Let's see. Let me just look here.
11   There's the remedial map -- oh, yes.
12 The overturn map is the one -- the one that
13 was overturned is the one in purple.
14   You asked -- if you look on page, that's
15 not numbered because it's just a blog post,
16 so I believe it's the third page.
17 Q   Oh, I see, okay.
18   So you're saying on Page 2, these
19 movies, these videos, the point you were
20 making there, as I read it, was that the 2023
21 proposed map was less responsive than
22 the 2022 map that was used in the election?
23 A   Yes.
24 Q   Okay. Did any of this analysis take
25 into account whether or not the special

26

1 master drawing in the 2022 map had actually
2 attempted to favor democrats over
3 republicans?
4   MS. THEODORE: Objection to form.
5 A   I'm not aware that they did do that.
6 Q   All right.
7 A   I mean, these are studies of the maps.
8 Q   Okay. You didn't do any analysis of
9 whether the 2022 maps drawn by the special
10 masters actually favored democrats over
11 republicans as compared to the 2021 map?
12 A   The main question here was whether --
13 two questions are answered here.
14   One of them was whether the maps were
15 responsive, and the answer to the question
16 was that they were not response, the
17 overturned maps; that is to say when the
18 electorate changed its opinions, the maps did
19 not change outcomes. And the remedial maps
20 did have that property and they tracked well
21 from what we saw from a unbiased distribution
22 created by our ensemble.
23 Q   All right. When you say the electorate
24 changed their opinion, how you do measure
25 that?

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1 A   Comparing different elections that have
2 different -- that express, you know,
3 different types of preferences.
4 Q   So you're just looking at election data?
5 A   Yeah. Well, election data and some
6 modeling of this election data. It depends
7 on which plot you're talking about.
8 Q   All right. Now, in this Exhibit 3, this
9 blog post that you wrote in October of 2023,
10 you did not express any opinion in this
11 article that the proposed maps were any sort
12 of racial gerrymander, did you?
13   MS. THEODORE: Objection to form.
14 A   We were just studying the maps as given.
15 Q   Right. And you didn't draw any
16 conclusions about the effect on race in the
17 maps, correct?
18 A   We just studied whether they were
19 responsive and how they responded to our
20 ensemble.
21 Q   So the answer is you did not make any
22 conclusion about the race?
23 A   We didn't speak directly about race. I
24 can't remember whether this ensemble had or
25 had not any information.

28

1 Q   Right. Okay. And as I read the blog
2 post, I don't see anything in here where you
3 criticize the legislature for not using
4 racial data; is that correct?
5 A   The scope of this was only about whether
6 it was a responsive map and how it compared
7 to the previous maps.
8 Q   All right. And when you say
9 "responsive," do you mean partisan? What do
10 you mean by "responsive"?
11 A   No. I think it goes to the idea that if
12 there's a change in opinion in election,
13 sometimes parties who are -- the people who
14 are elected should change.
15 Q   So when you say a change in the
16 opinion --
17 A   It's a nonpartisan idea. It just says
18 when the elections are heavily for one party
19 and then heavily for another party, when
20 those swings happen, there should, at least
21 to some of the seats, should be a change in
22 the outcome of the election. So the maps
23 should be measuring the votes of, you know,
24 the will of the people, if you will.
25 Q   All right. But what that boils down to

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1 ultimately is the partisan breakdown of how
2 people vote, right?
3 A Um-hmm. It breaks down to whether when
4 it swings from favoring one party to the
5 other party, should there be a change in
6 who's elected.
7 Q All right. Okay. So responsiveness, at
8 the end of the day, measures swings in
9 partisanship among voters?
10 MS. THEODORE: Objection to form.
11 A I wouldn't say that. It measures
12 whether the maps respect those swings.
13 Q All right. But it assumes that voters
14 are -- voters are voting differently with
15 regard to partisanship in one election versus
16 another?
17 MS. THEODORE: Objection to form.
18 A It doesn't assume anything. It just
19 takes different elections and they have
20 certain structures about where people voted,
21 how they voted, which parties they voted for.
22 And the geography of those patterns, and then
23 it looks across those patterns and sees how.
24 Q Right. So in measuring responsiveness,
25 is there anything other than the partisan

30

1 nature of how people voted that goes into
2 that calculation?
3 A What goes into that calculation is
4 whether the outcome changes when you move
5 from an election that tilts in one way to an
6 election that tilts the other way.
7 Q And how it changes from R to D or D to
8 R?
9 A Either. Right. Just changes. So it's
10 a partisan -- it's not a partisan question.
11 Q But at the end of the day, it is a
12 partisan question, right? Because if you're
13 measuring whether people are going from R to
14 D or D to R?
15 A I guess, I would say it's a question
16 about the functioning of whether the votes
17 are not democrat, with a little D not a big
18 D. Whether the system is a democracy.
19 Q Right. And the way you're measuring
20 that is the partisan outcomes of how people
21 voted, right?
22 A Right. If the people change who they
23 support, does the person elected get changed.
24 Q Okay. So let's go back to Exhibit 1.
25 A Sure.

31

1 Q Your May 31 report.
2 How long have you been at Duke?
3 A 2002 or 2003.
4 Q Okay.
5 A Depends on how you count.
6 Q So the way I understand this report was
7 you developed an algorithm to group counties
8 in North Carolina per the Stephenson and
9 Dickson rulings?
10 A Yes. We followed the procedure outlined
11 in those rulings and generated computer code
12 that followed those procedures.
13 Q All right. I'm not a math guy; used to
14 be a long time ago. I'm not any more.
15 How do you go about developing that
16 algorithm?
17 A We read the report and we took the parts
18 of that -- the steps in that ruling, the
19 steps in that ruling which could be automated
20 in a computer, not all of it could be. But
21 we took the parts that could be and then we
22 generated computer -- we thought about how to
23 do that efficiently. Then we wrote computer
24 code.
25 Q Okay. And what are the parts that you

32

1 recall that could be automated from those
2 rulings?
3 A So the rulings start off by saying that
4 if -- something about if there were BRA
5 districts, then those should be dealt with
6 or, you know, if there were things that had
7 to be dealt with first. And then after that,
8 there was an idea of clumping; first taking
9 counties that could, themselves, be
10 subdivided into an integer number of
11 districts plus or minus the tolerance, which
12 I believe is 5 percent in this case.
13 And then looked for group pairs of
14 districts that could be clumped, and then
15 again, be subdivided into an integer number,
16 a whole number. Integer -- by integer I mean
17 whole number of districts, and then triples
18 and then onward.
19 Q All right. So in developing the county
20 grouping rule for your algorithm, you
21 proceeded on single counties, two, three,
22 four, and so on?
23 A Right.
24 Q Okay. Does the code that you wrote to
25 do this grouping process have what's called a

33

1 main branch?

2 **A   I'm not quite sure what you mean by**
3 **that.**

4 Q   Okay. Is there a main branch and then
5 separate branches that key off from that?

6   MS. THEODORE: Objection to form.

7 **A   I mean, I'd have to go back and look at**
8 **the code. We wrote it a while ago, to**
9 **exactly remember. I presume most codes that**
10 **I've written, or have been involved in**
11 **writing, have subroutines.**

12 Q   Okay. So you've got the overall routine
13 and then subroutines?

14 **A   Yes.**

15 Q   So if I'm calling that a branch, the
16 subroutines would be like separate branches?

17 **A   I'm not a hundred percent sure what you**
18 **speak to, but that is my current**
19 **understanding of what you're asking.**

20 Q   All right. Okay. Are you familiar from
21 the Stephenson and Dickson cases of a rule
22 called the Traversal rule?

23 **A   I've been familiar with it in the past.**
24 **It's a bit -- I don't remember all the**
25 **nuances at this very moment.**

34

1 Q   Okay. Does the algorithm that you wrote
2 for your report in this case account for the
3 Traversal rule?

4   MS. THEODORE: Objection to form.

5 **A   My algorithm implements precisely what**
6 **the court asked to be implemented in**
7 **Stephenson.**

8 Q   All right. I just don't see anywhere in
9 the report where you address the Traversal
10 rule.

11   Do you address that anywhere in this
12 report?

13 **A   It's orthogonal to the conversation of**
14 **Stephenson.**

15 Q   Say that again.

16 **A   It's orthogonal to the conversation of**
17 **Stephenson.**

18 Q   Okay. What's orthogonal mean?

19 **A   Not relevant.**

20 Q   Okay. So the Traversal rule is not
21 relevant to the Stephenson grouping?

22 **A   It's my understanding. Stephenson is**
23 **just about putting together county clusters.**
24 **Not about the subdividing that happens within**
25 **those county clusters.**

35

1 Q   Okay.

2 **A   At least the part that's ruled out in**
3 **that algorithm. There may be other parts,**
4 **but I'm not a lawyer. And I don't claim to**
5 **have full recall of Stephenson at this**
6 **moment.**

7 Q   Right. Okay. So when you say that the
8 Traversal rule is not orthogonal to the
9 grouping requirement, is that something you
10 decided on your own or did somebody tell you
11 to treat it that way?

12   MS. THEODORE: Objection to form.

13 **A   We didn't do anything other than exactly**
14 **what was said in the Stephenson report.**

15 Q   Okay.

16 **A   So this is precisely what was said in**
17 **Stephenson.**

18 Q   All right. We can go look at
19 Stephenson. But I'll just tell you that in
20 the eight or nine bullet points in
21 Stephenson, about how to group and draw
22 districting under that ruling, there are
23 several of those bullets that address
24 traversals into counties.

25   So are you saying you just did not

36

1 address that?

2   MS. THEODORE: Objection to form.

3 **A   I think I need a clarification. Could**
4 **you clarify what exactly what you mean by the**
5 **"Traversal rule" --**

6 Q   Sure.

7 **A   -- because I think there maybe various**
8 **things that people refer to as that.**

9 Q   Okay. Got it.

10   So the Traversal rule says under
11 Stephenson, and then reaffirmed by Dickson:
12 That once you group the counties and you're
13 having to divide a county for purposes of
14 creating a district, you cannot draw a line
15 that traverses into a county more than one
16 time.

17 **A   So I believe the answer to your question**
18 **is the following.**

19   **There's a set of rules about how to**
20 **create the county clusterings, and then after**
21 **that, you, then, go and decide how to**
22 **subdivide each county cluster into districts.**

23 Q   Right. So my question is --

24 **A   The part of my report only deals with**
25 **creating the county clusters.**

37

1 Q   Okay. All right. That's what I was
2 wondering.
3   So this report does not deal with the
4 Traversal rule beyond the overall county
5 grouping?
6 A   That comes in a stage after this report.
7 Q   Okay. All right. In developing the
8 algorithm for the county grouping piece of
9 this, other than yourself, who contributed to
10 that, the development of that algorithm?
11 A   Greg Herschlag. Two students who worked
12 with us, whose names are on the paper, that
13 we originally wrote. And I always have
14 conversations with colleagues about ideas.
15 So I wouldn't want to swear that there was no
16 one else I talked to, but...
17 Q   Right. The students, are they on this
18 quantifying gerrymandering blog post?
19 A   No.
20 Q   No. All right.
21 A   They're on the report which is
22 attached -- no, they're not, actually,
23 they're on the original paper which developed
24 the algorithm.
25 Q   Got it. We'll look at that in a minute.

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1   In developing and implementing the code
2 for the county groupings that you did for
3 your report in this case, did you get any
4 input from a person named Blake Esselstyn?
5 A   I did not.
6 Q   Have you talked to him at all?
7 A   Since before -- since I've been -- I
8 have not talked to Blake since I was retained
9 for this case.
10 Q   Okay. And Mr. Esselstyn did a report in
11 this case. Are you aware of that report?
12 A   I'm not aware of that report.
13 Q   Did you talk to him at all about aspects
14 of his report before he submitted it?
15 A   No. I didn't talk to him about this
16 case at all.
17 Q   Okay. In developing the algorithm, can
18 you describe the role you play versus what
19 Dr. Herschlag plays in terms of the actual
20 development of the code?
21 A   Yeah, sure. So there are various parts
22 of the code. When we were developing the
23 code, we each wrote various parts of it and
24 put it together, and then tested it on
25 various examples. Sometimes he tests,

39

1 sometimes I test.
2 Q   Are there any aspects of the code that
3 Dr. Herschlag is primarily responsible for
4 aside from you?
5 A   There are sections of the code that he
6 wrote, that if we want to check or modify, he
7 would probably take the first crack at it.
8 Q   Okay. Would it -- this may be a fair
9 question, may not be, I'll admit that.
10   Would it be to fair to say that
11 Dr. Herschlag developed the majority of the
12 code?
13 A   I would have to go look at the code for
14 this particular piece of code to have an
15 opinion on that.
16 Q   Okay.
17 A   There are certainly parts that I wrote
18 the first draft of and certainly parts that
19 he wrote the first draft of.
20 Q   Okay. Was this grouping, county
21 grouping code, first published in
22 around 2020?
23 A   No. I'm actually not sure. I think it
24 was released much earlier than that, but I
25 really actually don't know.

40

1   We released it publicly, in a public
2 repository, so anyone could look at the code
3 and comment on it, you know, use it, in fact.
4 It's been used by both -- by many people.
5 Q   All right. So whenever it was
6 published --
7 A   Yeah.
8 Q   -- whenever that might have been, did
9 that version of the algorithm take race into
10 account at all?
11 A   All we did was follow what Stephenson
12 said.
13 Q   Okay. Did you make any attempt on that
14 code that was published back then to
15 incorporate the statements in Stephenson
16 about VRA districts?
17   MS. THEODORE: Objection to form.
18   Go ahead.
19 A   I mean, if you read our reports and our
20 paper, we very clear say at all points, like
21 first Stephenson says deal with the VRA, and
22 then deal with the county groupings. And so
23 the code has always been able to take
24 whatever you decide to start the county
25 groupings from.

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1 Q   So the code was not built as it was
2 published back then to take the VRA into
3 account?
4 A   It was always able to, yes.
5 Q   But it did not use racial data to try to
6 draw VRA districts?
7   MS. THEODORE: Objection to form. Go
8   ahead.
9 A   It just -- it assumed that one would
10 give those districts to the code.
11 Q   Okay. All right.
12   The code as it was originally published,
13 whenever it was, 2019, 2020, did the
14 algorithm in that published version of the
15 code give the computer person the ability to
16 freeze VRA districts and group around it?
17 A   It was already present in the code from
18 the very beginning. We updated the code a
19 little bit later to make it easier to do
20 that.
21 Q   All right. Okay. So you're saying that
22 as originally published, 2019, 2020, the code
23 allowed for freezing of districts to group
24 around them?
25 A   Yes. It allowed for a version of that

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1 in the very beginning.
2 Q   We'll look at what we'll mark as 4.
3   (Whereupon, Article "Optimal
4   Legislative County Clustering in
5   North Carolina" was marked as
6   Exhibit 4 for identification as
7   of this date.)
8 Q   Does this article look familiar to you?
9 A   Yes. It does.
10 Q   Was it -- it looks like it was published
11 in 2020?
12 A   To clarify. this related to my previous
13 answer, the version was published in 2020,
14 but it was released publicly on a publicly
15 available preprint archive, I think earlier
16 than that, 2019 at least. Hence, my
17 equivocating on your previous question.
18 Q   All right. Just in general, what was
19 this article about?
20 A   This article was about the outcome of
21 our project to implement the Stephenson
22 procedure in code, in Python, and then used
23 in some simple experimentation with it.
24 Q   All right. Is there anything in this
25 article that discusses freezing VRA districts

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1 and grouping around those?
2 A   First of all, it's a long article that I
3 wrote a long time ago. So I do not want
4 to -- I believe that it -- my -- let's see.
5 Yes, on Page 20, it talks about VRA districts
6 at least.
7 Q   It says there that, "For purposes of
8 this paper, we avoid considering race when
9 clustering the clusters because they were
10 adopted without considering VRA"; is that
11 right?
12 A   I don't think that's what it says.
13 Q   Yeah. Look on the left-hand side of the
14 page. Toward the bottom, it says, "For the
15 purposes of this paper."
16 A   You said a lot of other things, which I
17 don't think -- it just says that -- let me
18 read.
19   So I believe in this paper we -- and in
20 the other paper that came afterwards, we were
21 very clear that we only dealt with what
22 happened after it had been decided whether or
23 not there were VRA districts or not and
24 whether they were specified. And we were
25 only deal within with the second part of that

44

1 conversation.
2 Q   So as of this paper that we're looking
3 at, Exhibit 4, you did not consider race,
4 correct?
5 A   Right. We were only considering the
6 part of the Stephenson algorithm that came
7 after one in deciding whether they were VRA
8 districts or not.
9 Q   All right. It looks like the Stephenson
10 rules you label as constraints; is that
11 right?
12 A   Where are you looking, if I may ask?
13 Q   It's the same page, just going down a
14 little bit further.
15 A   Oh, yes.
16 Q   Constraints one, two and three.
17   Do you see those?
18 A   Yes. Let me just read up above.
19   Yes.
20 Q   And the three constraints you note in
21 these paragraphs do not involve traversals,
22 correct?
23 A   These constraints above are just from
24 the North Carolina constitution. I think
25 these are direct statements from the

45

1 constitution.
2 Q   Yeah, correct. But they don't involve
3 anything about traversals?
4   MS. THEODORE: Objection to form.
5 A   I'm confused. I think we already
6 established that these algorithms deal with
7 the part before the traversals.
8 Q   Okay. All right.
9   Now, is there anything in this article,
10 Dr. Mattingly, that discusses freezing VRA
11 districts and grouping around them?
12 A   I don't remember if it's in this article
13 or the other one. I know in some of these
14 articles we absolutely talk about the idea
15 that one has to decide ahead of time whether
16 there are VRA districts or not. And then
17 after that, run the algorithm as we presented
18 it. I don't recall whether we exactly
19 discussed that in this one or the other ones.
20 I certainly remember discussing it.
21 Q   All right. If you look at the last
22 page, there's a section called
23 Acknowledgments.
24 A   Yes.
25 Q   It says:

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1   "The authors are thankful to
2 Blake Esselstyn and Eddie Speas bring
3 this important question to our
4 attention, as well as generally
5 educating us about legal and GIS issues
6 involved."
7   What was the important question that
8 they brought to you potentially?
9 A   Yeah. So, first of all, I have to say,
10 this was published in 2020, it was probably
11 first posted in 2019, which means the work
12 was probably done in 2018, '17. So you're
13 asking me to remember through the haze of
14 time, right, so.
15   What I believe we were talking about
16 right then was the fact that the government,
17 the court, the citizens of North Carolina, at
18 that moment had no reliable way to generate
19 the county clusterings. Right. Somebody
20 brought up some county clusterings and just
21 presented them. And usually when they
22 presented them, they only had one county
23 clustering. The one that they found, and I
24 don't know how they found it.
25   And I thought it was an interesting

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1 question to say, wouldn't it be nice to give
2 to the state, the courts, the legislature,
3 the people, the ability to see what the
4 county clusterings were, what possible county
5 clusterings existed. And that was the
6 problem.
7 Q   All right. And that's primarily what
8 this article was addressing?
9 A   Correct.
10 Q   Was this article ever peer reviewed?
11 A   Yes.
12   MR. STRACH: Can we take a quick
13   break?
14   THE WITNESS: Sure. If you want.
15   MR. STRACH: Five minutes.
16   Is that all right, Elizabeth?
17   MS. THEODORE: Yeah, sure.
18   (Whereupon, a recess was taken
19   from 11:02 AM until 11:10 AM.)
20 Q   Do you recall when you first published
21 the code that allowed you to freeze the VRA
22 districts and then group around them?
23 A   So, as I already stated, the code from
24 the very beginning had that ability. It was
25 not difficult to do that. We made it a bit

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1 more explicit in an update in 2023, I
2 believe, in the fall of 2023.
3 Q   In the fall of 2023?
4 A   I believe that's correct.
5 Q   All right. And I think you said you
6 were retained in the spring of '24?
7 A   Sorry, say that again.
8 Q   You were retained for this case in the
9 spring of '24?
10 A   Correct.
11 Q   Okay. Is there a reason why you updated
12 the code to make it more explicit about
13 freezing districts in 2023?
14 A   We had always intended to make that more
15 explicit. Anyone who asked, we told them
16 that was possible. We were also at a special
17 semester at a research institute, that
18 semester, talking about fairness in
19 algorithms and gerrymandering. And just in
20 various conversations, it can kind of come
21 back to our mind that we'd always meant to do
22 and we wanted to experiment a little bit.
23 Q   What was the institute that you
24 mentioned?
25 A   SLMath.

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1 Q   What is that, for somebody knows nothing
2 about it?
3 A   It's a government institute in the hills
4 of Berkley, privately and publicly funded in
5 San Francisco. Well, in Berkley, to be
6 exact.
7 Q   All right. So was it sort of a
8 conference or something?
9 A   There was a semester on fairness and
10 algorithms, talking about everything from
11 machine learning to auctions, types of
12 auctions, to all different stuff.
13 Q   What brought you out there? Were you
14 teaching a course or just visiting?
15 A   I was one of the organizers of the
16 semester.
17 Q   All right. This institute, does it have
18 a website, is it publicly available?
19 A   Yes. It does have a website.
20 Q   So in 2023, you published the code that
21 made it more explicit about its ability to
22 freeze districts and group around them; is
23 that right?
24 A   Yeah. We periodically, you know, tweaks
25 we've made to the code mature, we sometimes

50

1 decide that if other people seem that may be
2 interested in having that ability, we push it
3 forward. We were talking to someone at
4 Oklahoma about some of their work related to
5 our work.
6 Q   Okay. When you made that -- when you
7 tweaked the code to make that more explicit,
8 did you ever reduce that to any sort of
9 article?
10 A   No.
11 Q   All right. Has that aspect of this code
12 ever been peer reviewed?
13 A   The code is not explicitly peer
14 reviewed. It's on a website -- it's on a
15 publicly facing archive. Anyone can look at
16 it.
17 Q   Right.
18 A   So the articles are what appear.
19 Q   Right. That's my question. Other than
20 this 2020 article, when you tweaked the code
21 to address the freezing issue, did you ever
22 reduce that to an article to be peer
23 reviewed?
24 A   No. However, I will say that the main
25 body of the code largely didn't change. It's

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1 really about the preprocessing.
2 Q   All right. But in this 2020 article
3 that's labeled Exhibit 4, which was peer
4 reviewed, this article does not address the
5 freezing process, correct?
6 A   Right. We didn't write another article
7 after we treat the code. This one does not
8 directly address that.
9 Q   In publishing that code in late 2023,
10 did you have any discussions with lawyers
11 involved in this code about, wow, that'd be a
12 great idea, let's do that?
13 A   No.
14 Q   Okay. And the code that you published
15 in late 2023, is that the exact same code
16 that you used in this case?
17 A   Yes.
18 Q   Okay.
19 A   I believe so. I mean, there's other
20 code around it, but the repository is the
21 same repository.
22 Q   All right. So it's essentially the same
23 code that you used for this case that you
24 published in October of 2023?
25 A   I believe so, yes.

52

1 Q   Okay.
2 A   Yeah. I believe so. I'd have to check.
3 It's certainly based on it. We always make
4 small changes when you need to do something.
5 Q   All right. Sitting here today, are
6 there any material differences between the
7 code you used in this case and that code?
8 A   I don't believe so. We may have
9 refined -- I can't remember when we added a
10 second way to think about freezing districts.
11 I can't remember whether it was in the one we
12 released in 2023 or -- because that was the
13 main addition beyond what was already easily
14 done in the earlier code.
15 Q   All right. So let's talk about that.
16 A   One second. If you don't mind. Sorry.
17 Q   So as I recall from the report you
18 submitted in this case, which is Exhibit 1,
19 as I recall, you had two different ways of
20 dealing with counties that were split and
21 regrouping. Can you explain those?
22 A   Yes. So, in one way, you simply -- are
23 you asking about freezing? You said split.
24 Did you mean split?
25 Q   I'm sorry. Freezing and then

53

1   regrouping.
2   **A   Yes. Okay.**
3   **In one of them, you simply freeze**
4   **districts and essentially remove them from**
5   **the map. So pretend that they were not ever**
6   **in the map. And whatever's left, that's a**
7   **new state and you redistrict on that state.**
8   **In the other way, you essentially freeze**
9   **a district and say, this district will**
10 **maintain as whole, but must be included in**
11 **some county grouping.**
12 Q   Okay.
13 **A   Right. And it kind of -- it depends a**
14 **little bit, in many of the easy cases, some**
15 **of the cases, you're taking out an entire**
16 **kind of county, entire district, and then**
17 **what's leftover, you just treat that as a**
18 **new -- and those are the new county**
19 **groupings. It was not clear to us what was**
20 **exactly intended in Stephenson, so we made**
21 **two different.**
22 Q   So you've developed two different ways
23 to deal with grouping around the freeze
24 districts, right?
25 **A   Yes.**

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1   Q   Okay. What aspect of that was present
2   all the time in the original algorithm?
3   **A   They were essentially both there always.**
4   **It was most easiest and transparent probably**
5   **to just do the one where you simply removed a**
6   **part from the state, but the other one was**
7   **also doable from the very beginning.**
8   Q   All right. For the second strategy for
9   dealing with frozen district and regrouping,
10 when did you actually publish that code?
11 **A   I'm a little -- I don't recall**
12 **precisely.**
13 Q   Was it after you were retained in this
14 case?
15 **A   Again, I don't recall.**
16 Q   Okay. If you look at back at
17 Exhibit 11, your primary report, you have a
18 section on the fourth page.
19   Called, "Accounting for districts that
20 may be required by the VRA."
21   Do you see that?
22 **A   Yes.**
23 Q   Are you familiar with a case called the
24 Gingles case?
25 **A   Loosely, yes.**

55

1   Q   Anything that you recall about the
2   Gingles case as you sit here today?
3   **A   It's about the Voting Rights Act.**
4   Q   Okay. In this case, do you intend to
5   offer any opinion on the Gingles factors?
6   **A   I only intend to offer an opinion on**
7   **what happens when you write this Stephenson**
8   **algorithm.**
9   Q   All right. Let's look at Page 6, which
10 appears to be your regrouping around the
11 plaintiff's demonstration District A.
12   Do you see that?
13 **A   I see the output of the Stephenson**
14 **criteria, yes, District A.**
15 Q   All right. And what is District A? Is
16 it that yellow district at the top of the
17 state?
18 **A   I'd have to check, but it's the --**
19 **described in the section above.**
20 Q   Right, okay. Right that's Vance,
21 Warren, Halifax, et cetera?
22 **A   Correct.**
23 Q   Then just below that district, there is
24 a purple grouping constituting Edgecombe and
25 Pitt.

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1   Do you see that?
2   **A   I do.**
3   Q   All right. And were you asked by
4   counsel in this case, to freeze that -- those
5   two counties as well as the district to the
6   north?
7   **A   For demonstration District A, yes.**
8   Q   All right. So in this part of the
9   report you froze both the VRA districts to
10 the north, which is Vance, Warren, Halifax et
11 cetera, and you also froze Pitt and
12 Edgecombe?
13 **A   Yes. For demonstration for District A.**
14 Q   But Pitt and Edgecombe are not in
15 demonstration District A; is that correct?
16 **A   I'm not sure what, I'm not privy to all**
17 **the -- exactly how you want to refer to this.**
18 **All I know is I was asked to freeze the**
19 **regions that are listed here. Which include**
20 **Pitt and Edgecombe and also have north --**
21 **Vance, Warren, Halifax, all the way through**
22 **to Washington.**
23 Q   So sitting here today, you don't know
24 why you were asked to freeze those two
25 counties?

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1 A No. I was asked to freeze those and
2 then produce what the Stephenson algorithm
3 would produce for county groupings after
4 those were removed.
5 Q All right. So is it fair to say then
6 that in this map on Page 6, the groupings
7 that your algorithm produced are dependent
8 upon demonstration District A and
9 Pitt-Edgecombe being frozen?
10 A If -- I can say this, if you freeze
11 those districts, this is the outcome of the
12 Stephenson algorithm.
13 Q Right, okay, and below the statewide map
14 there's, you depict different choices among
15 groupings that the legislature can make if
16 this was the grouping, right?
17 A That's correct.
18 Q And so for instance, if you look at --
19 these aren't labeled so I'm going to do the
20 best I can.
21 A That's all right.
22 Q Underneath the statewide map you got
23 groupings kind of in the west, do you see
24 that?
25 A Yes. The ones that are orange.

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1 Q Yeah. Then you have a set of groupings
2 that are in the east.
3 Do you see that one?
4 A Yes. There are two groupings in the
5 east and a grouping in the west.
6 Q Right. So it appears to me that in both
7 groupings in the east there would be two
8 choices in the east regarding groupings,
9 right?
10 A Yes.
11 Q And both groupings have in common a very
12 large grouping in the east that comprises the
13 entire eastern part of the state and then a
14 bunch of counties a little bit to the west of
15 that?
16 MS. THEODORE: Objection to form.
17 A I mean, I don't know what very large
18 means, this is the output of the algorithm.
19 Q Okay, right. So I just want to make
20 sure I'm clear on is that both of those
21 eastern North Carolina groupings, there's one
22 very large grouping and then one grouping
23 that consists of about two counties?
24 MS. THEODORE: Objection to form.
25 A There's one that consists of two

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1 counties and then there's a main one, yes.
2 Q And these two groupings in the east, you
3 did not -- you didn't make any attempt to
4 draw districts within those groupings, right?
5 A I did not.
6 Q Then your report goes on to discuss
7 demonstration District B.
8 Do you see that?
9 A I actually just want to make one
10 clarification, you may not have noticed that
11 it runs across the top on the other page.
12 Q I just saw that, yeah, and the one that
13 runs across the top on Page 7, similarly has
14 one, I'm going to call it large grouping, you
15 people can dispute what that means. But then
16 there's a second grouping of two counties at
17 the bottom, right?
18 MS. THEODORE: Objection to form.
19 A Just to clarify, in the east, we were
20 mistaken when we said earlier there are
21 actually three choices and it consists of two
22 different groupings, yes.
23 Q Right, okay.
24 All right. So then if we look at
25 demonstration District B.

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1 And look at the groupings and the
2 choices on Page 8.
3 A Um-hmm.
4 Q This one, the frozen district is Chowan,
5 Warren, Gates, Halifax, et cetera?
6 A Chowan, Warren, Gates, Halifax all the
7 way through to, yes.
8 Q And then in this particular frozen
9 district in District B, it splits Pasquotank
10 County; is that right?
11 A Yes. As described in the paragraph just
12 below the heading of District B.
13 Q All right. So here where you have a
14 split county in the frozen demonstration
15 district, what does your algorithm do to
16 account for the split county?
17 A So as I described earlier, there are
18 two-ways it goes about that. It either just
19 says we're going to remove this part of the
20 map completely and have that be one -- just
21 remove that district completely and then
22 district the rest, or alternatively -- let me
23 just make sure I'm looking in the right
24 place.
25 So there were two choices I described

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1 earlier and by the way, nothing that we did
2 those choices matter, it just freezes that
3 district and then it builds the county
4 clusters around it.
5 Q   But how does it treat specifically the
6 split county?
7 A   In one case it freezes those as a
8 district and then pairs that to create a kind
9 of clustering. The other one it removes that
10 from consideration and then sees what the
11 other county cluster would be to complete
12 that. It turns out that subtly doesn't
13 matter. It gives the same answer in all
14 cases.
15 Q   Okay. And so the algorithms ability to
16 treat that split county in the two different
17 ways you've described, has that algorithm
18 ever been peer reviewed?
19   MS. THEODORE: Objection to form.
20 A   I'm not sure what you mean by peer
21 reviewed.
22   The papers are peer reviewed, the code
23 is released to the public.
24 Q   So you've never published a paper about
25 how to deal with split counties in this

62

1 manner that's been peer reviewed?
2 A   No.
3 Q   Then in demonstration District C with
4 the maps on the next page, in that one it was
5 a frozen district consisting of Hertford,
6 North Hampton, et cetera and then it split
7 Vance County; is that right?
8   MS. THEODORE: Objection to form.
9 A   It's a rather long paragraph that
10 describes it right under the --
11 Q   Right. But in District C it splits
12 Vance, right?
13 A   Yes. It says eight of 12 precincts of
14 Vance County.
15 Q   All right.
16 A   These were frozen, yes.
17 Q   So then looking at the statewide map on
18 the next page.
19   Does that map show Vance County split in
20 some manner. What is that map reflecting?
21 A   I have to look at where Vance is
22 exactly, I always get confused. Vance is
23 right up here, right.
24   Well, it puts it into a cluster. So all
25 it was saying was that was frozen into one

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1 district. It put it in a cluster with three,
2 right.
3 Q   Right. So Vance County is the county to
4 the right of this green?
5 A   That's right. Right next to Granville,
6 I believe, correct.
7 Q   So this map does not reflect it as being
8 split, it reflects it as being whole?
9 A   No. It reflects all of Vance County
10 being in a three county cluster. It was
11 based on having the previously mentioned
12 districts being one of those three districts.
13 Q   Okay. In this map, which is
14 demonstration District C, do you also freeze
15 Pitt-Edgecombe in this one?
16 A   I don't believe so. No.
17 Q   And is there a reason for that other
18 than that's what you were told not to do?
19 A   I just -- I created the frozen districts
20 and saw what the Stephenson algorithm did
21 around that.
22 Q   All right. Then if you look at
23 demonstration District D, just below that on
24 the page, you froze a district consisting of
25 Bertie, Halifax, et cetera which also

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1 included Pasquotank split; is that right?
2   MS. THEODORE: Objection to form.
3 A   It says it includes six of the nine
4 precincts of Pasquotank, yes.
5 Q   So Pasquotank was not whole in that
6 demonstration District D.
7 A   They were frozen, right. I think that
8 in the county clusterings, yeah, no, it's
9 just what it says there.
10 Q   So in the demonstration District D, the
11 demonstration district splits Pasquotank, but
12 you include it as whole within one county
13 grouping?
14 A   Correct. I believe this is the one
15 that's labeled three or did I get the wrong
16 one.
17   MS. THEODORE: I think you need to
18   flip to the next page.
19 A   Oh, I'm sorry. I'm on the wrong page.
20 Q   Yeah, it's the map right above your
21 signature.
22 A   Yeah, yeah, sorry. I apologize. I was
23 confused. Yes, the one that has two, the
24 yellow, so there are two districts in there.
25 One of them being the aforementioned.

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1 Q   Okay. And was there a way to run the
2 grouping by treating the split part of
3 Pasquotank as a whole county and then
4 including the rest of Pasquotank in a
5 different grouping?
6 **A   That wasn't a decision that was made by**
7 **us, that's a decision that's made by the**
8 **Stephenson algorithm.**
9 Q   Okay. I believe Plaintiff's have
10 submitted a demonstration District E in this
11 case. Have you run the same analysis on
12 that?
13 **A   I believe that's the one in my rebuttal**
14 **report.**
15 Q   Okay. Let's take a look at Exhibit 2.
16   And this one also includes Bertie,
17 Gates, et cetera, and part of Pasquotank
18 County; is that right?
19 **A   Yes. That's described in the beginning**
20 **of Section 2.**
21 Q   All right. And in both of the results
22 of your regrouping around District E,
23 Pasquotank is shown as whole in the grouping;
24 is that right?
25 **A   Again, it's in a grouping, these**

66

1 **drawings are showing not the individual**
2 **districts, but showing the groupings. So**
3 **it's saying that the county is an entire**
4 **grouping, District 2 with two districts, the**
5 **rust colored one and the far northeast of the**
6 **state.**
7 Q   If I'm looking at this right, it's
8 showing Pasquotank as being a whole county
9 within that grouping; is that right?
10 **A   Yes. These are the county -- yes, it's**
11 **saying there should be two districts in that**
12 **county grouping.**
13 Q   Okay. And in Exhibit 2, the rebuttal
14 report, did you freeze Pitt-Edgecombe in this
15 one?
16 **A   I believe you're speaking to the map at**
17 **the top of Page 2; is that correct?**
18 Q   Yeah.
19 **A   So this is freezing part of what was**
20 **frozen previously in demonstration**
21 **District A, but now we did not freeze Pitt**
22 **and Edgecombe.**
23 Q   What about the map on Page 3, does that
24 freeze Pitt and Edgecombe?
25 **A   I do not believe so. It just lists the**

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1 **frozen, doesn't list Pitt and Edgecombe.**
2 Q   And is there a reason why in District A
3 you froze Pitt and Edgecombe, but not in any
4 of the other districts other than what -- the
5 instructions you got from counsel?
6 **A   The reason was, is that is what I was**
7 **asked to do.**
8 Q   Thank you.
9   All right. We're going to look at what
10 I'll mark as Exhibit 5.
11   (Whereupon, Screen shot from
12   Code Repository was marked as
13   Exhibit 5 for identification as
14   of this date.)
15 Q   So I'll just tell you this is a screen
16 shot from the code repository that you
17 produced in the backup data, at the very top
18 it says master, what does that mean?
19 **A   That's the branch of the Git repository**
20 **that's holding this code.**
21 Q   Would it be fair to call it a master
22 branch?
23 **A   Yeah, I mean, nowadays we usually call**
24 **it main. But when this repository was**
25 **created it was still called master.**

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1 Q   Okay. So you see it's got some dates
2 associated with it?
3 **A   Yes.**
4 Q   Down at the bottom it's August 30, 2019;
5 was that the first time that the code base
6 was added to the repository?
7 **A   I believe so.**
8 Q   All right.
9 **A   It says initial commit, so that seems to**
10 **back that up.**
11 Q   And it's this code labeled August 30,
12 2019, that was peer reviewed, correct?
13 **A   The code wasn't, the article was.**
14 Q   Okay. The article was based on this
15 code dated August 30, 2019?
16 **A   The article used this code. So the**
17 **content of the output of this code.**
18 Q   All right. And when you say a main or
19 master branch of the code, what is that?
20   MS. THEODORE: Objection to form.
21 **A   It's an inversion control software, like**
22 **GIT, it's a way of tracking different**
23 **branches, if you want to create other**
24 **branches of a code base. Sometime it's**
25 **useful when multiple people are working on**

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1 code or even just by yourself.

2 Q Okay. So is it way to test new features

3 of the code and then merge them into the main

4 branch?

5   MS. THEODORE: Objection to form.

6 **A That could be a use of it. It's not**

7 **exclusively or always a use of it.**

8 Q Okay. And then it looks like if we're

9 just going up a little bit, it looks like

10 there were some changes in July of 2021, does

11 that look correct?

12 **A Yes.**

13 Q What were those changes?

14 **A So I really couldn't comment without**

15 **seeing the exact modifications to the code.**

16 **I'm basing all my answers on the annotations**

17 **made in the commit. It seems that one of**

18 **them was adding a wrapper, which -- for**

19 **fuzziness we call it, which let us search the**

20 **tree in a broader way than Stephenson**

21 **requested. Another one apparently was just**

22 **some small teak, a bug somewhere that was**

23 **found. Some output or something that wasn't**

24 **the way we wanted it. The other one was an**

25 **example notebook that was added. We added**

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1 **some example notebooks to use the code. This**

2 **is all public, or course, so this is out**

3 **there for review in the public, yeah.**

4 Q Okay.

5   And it looks like there was another

6 update in October of 2023, right?

7 **A Yes.**

8 Q And is the October 3rd update the

9 freezing ability that was added?

10   MS. THEODORE: Objection to form.

11 **A As I already stated, the freezing**

12 **ability was already there. It just gave some**

13 **hooks to make it a little easier for somebody**

14 **to use.**

15 Q Okay. And so then all these changes in

16 July of '21, October 2023, were they, then,

17 included in the master or main branch?

18 **A You're asking me things that are very**

19 **hard to check right here. So I really -- I**

20 **can't. I believe so. These are all -- if**

21 **you -- I don't know where this came from. I**

22 **assume this is from our GIT repository. It**

23 **says -- it purports to be the master printout**

24 **of the comments from the master branch, you**

25 **know, without going in and checking, I can't**

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1 **say with any certainty of what you're asking.**

2 Q Okay. All right. Let's look at what

3 I'll mark as Exhibit 6.

4   (Whereupon, Screenshot of Code

5   Repository was marked as Exhibit

6   6 for identification as of this

7   date.)

8 Q This is just another screenshot from

9 your code repository, that you produced to

10 us?

11 **A Yes.**

12 Q Does it look familiar?

13 **A I can read what it is. I think I know**

14 **what it is, but I haven't looked at this**

15 **recently.**

16 Q Okay. It looks like something was added

17 April 28, 2024.

18   Can you describe to me what that is?

19 **A Let me just read it.**

20   **Yeah, so, I mean, again, it's hard for**

21 **me to actually comment what's here. I'm**

22 **basing -- almost everything is based on my**

23 **vague recollection of what was happening at**

24 **that time and what the comments are here, so**

25 **you're talking about the April 28? Is that**

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1 **the one?**

2 Q Yes.

3 **A So I wrote some code, which I had**

4 **separate from for a while that did some**

5 **visualizations. And I merged some of that**

6 **back into the main code base and sent it to**

7 **Greg and he merged it into this. I mean, he**

8 **committed it to this base.**

9 Q Okay. And was this change made after

10 you were contacted by counsel to help in this

11 case?

12 **A I'm not sure. But this is about**

13 **visualization.**

14 Q All right.

15 **A That's what the graying out means.**

16 Q Did the April 28 change make any

17 substantive changes to the algorithm?

18 **A Based on what's written here in the**

19 **comments, I would say no. But I don't have**

20 **access to that information.**

21 Q Okay. Then there's another change on

22 May 20, 2024, that says, "Adding partial

23 clustering capability."

24   Do you see that?

25 **A Yes.**

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1 Q   And did that create additional code or
2 alter any code in the existing algorithm?
3 A   Again, I didn't make this commit and I
4 can't comment precisely what's in this
5 commit.
6 Q   Who could? Dr. Herschlag?
7 A   I mean, if I had access to the Git
8 Repository, or he could, yes.
9 Q   Was this May 20th change -- I mean, it
10 says adding "partial clustering capability."
11   Did that change allow you to deal with
12 counties that were split in terms of the
13 freezing capability?
14 A   So, again, I don't recall exactly. Not
15 always when commits are made are when the
16 code might have been changed. It might just
17 take someone a while to pushing it to the
18 repository. We sent you the code that we
19 used entirely. I believe as a -- we sent
20 them as an attachment or something or we gave
21 them access to the repository in the -- when
22 we -- in the code we used.
23   This -- the ability to do the partial
24 clustering was always, in one way, at least,
25 was always there. We did implement one of

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1 these two methods at a later date, and I
2 can't remember exactly the timing of that.
3 And this is when this was pushed to this
4 repository. I don't know exactly when that
5 change was made.
6 Q   All right. But the best information we
7 have is that it was done around May 20, 2024?
8   MS. THEODORE: Objection to form.
9 A   I don't know if that's the best
10 information we have. That's -- I mean,
11 you've only given me this printout of this
12 repository. I'd have to check other things
13 and it may not even be checkable.
14 Q   Did this change on May 20, 2024, did it
15 require adding new lines of code to the
16 algorithm?
17   MS. THEODORE: Objection to form.
18 A   As I said, this is just recording when
19 this was checked into the repository. The
20 editing or code may have been changed at a
21 different time. And I don't -- from
22 without -- from what you've given me, it's
23 impossible for me to tell you exactly what
24 this change was.
25 Q   All right. Is it fair to say, though,

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1 that whenever the change was made it would
2 have added lines to the code?
3 A   Again, without -- I don't know if it
4 added lines.
5 Q   Okay. All right. Then there was
6 another update on May 29, 2024.
7   Do you know if that update altered any
8 of the code or the algorithm?
9 A   I mean, presumably since it was
10 pushed -- since it was recorded as a change,
11 it changed something. I can't attest to what
12 was changed, what changed exactly.
13 Q   All right. And it looks like
14 Dr. Herschlag could speak to that?
15   MS. THEODORE: Objection to form.
16 A   Or the repository, yes, yeah.
17 Q   Okay. Where it says, "Greying changing"
18 at the top, what does that mean, "greying"?
19 A   Where are you talking?
20 Q   At the very top of the exhibit,
21 G-R-E-Y-I-N-G?
22 A   Okay. I believe that this is all -- my
23 best guess, is that this has to do with
24 merging my individual code into that main
25 branch. Greying is just when you look at

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1 these pictures here.
2 Q   The grey areas?
3 A   The ability to pull these out in a
4 systematic way. When we first did this
5 paper, we had to do this by hand and it was
6 laborious and irritating. And then I wrote
7 code which was not merged into the main
8 branch that I just ran separately, and I
9 passed it on when we used it in this case.
10 Q   So it was merged into the main branch
11 after you published your paper in 2020?
12 A   It was not -- it's secondary. It's not
13 the main algorithm. It has nothing to do
14 with the Stephenson algorithm. Once you get
15 the answer out of the Stephenson algorithm,
16 how do you make the graphs to present those
17 answers.
18 Q   Okay. Let's look at what we'll mark as
19 Exhibit 7.
20   (Whereupon, Printout "Adding
21   Partial Clustering Capabilities"
22   was marked as Exhibit 7 for
23   identification as of this date.)
24 Q   So I'll tell you that this is a printout
25 from the "Adding partial clustering

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1 capabilities branch."
2   Does that look familiar to you?
3 A   The branch?
4 Q   Yeah. The -- we saw that on May
5 20, 2024, in Exhibit 6, it had an entry
6 called "Add in partial clustering
7 capability."
8   This appears to show --
9 A   Yes. That was not a separate branch,
10 but, yes, that's a commit, yes.
11 Q   Okay. Got it. Commit.
12   This appears to show changes made to the
13 actual code as part of that; is that correct?
14 A   Yes.
15 Q   All right. And if I'm reading it
16 correctly, at the top, it says there were 130
17 additions and 9 deletions; is that right?
18 A   That's what the Git merge routine did.
19 It's -- I mean, that's not something you
20 should infer a lot from. But, yes, that's --
21 it definitely says at the top "130 and 9
22 deletions".
23 Q   Okay. So as of this May 20, '24 date,
24 there were, in fact, changes, additions and
25 deletions made to the actual code, correct?

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1 what were -- what was made by Dr. Herschlag
2 versus what was made by you?
3 A   I could not. These changes are all out
4 of context. These are just one line changed
5 here, one line. There's no context in the
6 code.
7 Q   All right. And do you know if you
8 worked with the Dr. Herschlag to make these
9 changes?
10 A   We discuss everything, yeah.
11 Q   Okay. And after these changes were
12 made, did you take time to vet the changes?
13 A   What do you mean "vet the changes"?
14 Q   So run them to make sure they were doing
15 what they were supposed to do?
16 A   We checked -- we got consistent output
17 with our runs, yes.
18 Q   Okay. Were these changes in Exhibit 7
19 ever merged into the main branch; to your
20 recollection?
21   MS. THEODORE: Objection to form.
22 A   I have no idea.
23 Q   Okay. Is it standard practice to merge
24 changes like this into the main or master
25 branch?

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1   MS. THEODORE: Objection to form.
2   Go ahead.
3 A   I'm not sure. Some of these -- what all
4 these have to do with, I'd have to check.
5 Some of these I definitely see have to do
6 with the plotting of the imagery. As I
7 mentioned, some of them have to do with --
8 yes, some of them have to do with -- yes,
9 it's changes to the code.
10 Q   All right. And it looks like maybe
11 Dr. Herschlag made those changes to the code;
12 is that right, he's named at the top?
13 A   He's the one that made this commit. It
14 doesn't mean me made these changes.
15 Q   Okay. And tell me what a commit is for
16 a non-math guy.
17 A   It's a term when you push changes to
18 code to a repository, commit them to a
19 repository.
20 Q   Okay. And some --
21 A   Some of these look like my plotting
22 code.
23 Q   Okay. Yeah, I was going to ask you.
24   So sitting here today looking at this
25 exhibit, can you tell me of these changes,

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1 A   It just depends on your workflow.
2 Different people make different choices. I
3 do sometimes. I do not other times.
4 Q   And if you look back at Exhibit 6, which
5 are the greying changing thing. Is it fair
6 to say that the version of the code that you
7 used to produce your report in this case,
8 used the May -- used the code as of May 29,
9 2024?
10 A   It's really hard for me to be precise
11 about that. I don't know.
12 Q   If you had used the code from 2019 that
13 we looked at earlier, the initial commit from
14 2019, if you used that code to run your
15 analysis for your report in this case, would
16 it have worked without errors?
17   MS. THEODORE: Objection to form.
18 A   It's -- I mean, sometimes the initial
19 commit is a blank. Has no code in it at all.
20 So I'm not sure, I'd have to go look.
21 Q   Okay.
22   MR. STRACH: Let's take a quick break.
23   THE WITNESS: Sure.
24   (Whereupon, a recess was taken
25   from 11:59 AM until 12:01 PM.)

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1   MR. STRACH: Back on the record.
2   Q   If you'll look back at Exhibit 5,
3   Dr. Mattingly.
4   **A   Hold on one second.**
5   **Yes, please.**
6   Q   Just a couple of questions about this.
7   At the very top, on October 3, 2023, it
8   says, "Updating with ideal pop control and
9   linting."
10   What's "ideal pop control"?
11 **A   Okay. Again, so without actually**
12 **looking at the code, there was a line at the**
13 **very top of the code that let one set the**
14 **ideal population per district, like what do**
15 **you want the population district is. The**
16 **earliest versions, you could always just edit**
17 **that line and change it to be whatever you**
18 **wanted, but by default, it's set to the**
19 **state's population as divided by the total**
20 **number of the districts.**
21   **We just made it a little bit explicit**
22 **there that if one wanted to -- that one could**
23 **explicitly by hand set the ideal population,**
24 **which was something that was an easy mistake**
25 **one would make if one wasn't careful when**

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1   **freezing certain districts that you might**
2   **accidentally set the population to be**
3   **something different than what it was supposed**
4   **to be.**
5   **So it just made it more user friendly to**
6   **the set that ideal pop.**
7   Q   Okay. Do you remember what it was set
8   at?
9   **A   No. It's set at whatever the state**
10 **population divided by the number of**
11 **districts.**
12 Q   Okay.
13 **A   And linting is a computer science term**
14 **referring to the checking of code that it's**
15 **in kind of good formatted shape, and it seems**
16 **to have no kind of prima fascia formatting**
17 **errors that would lead to bugs.**
18 Q   Okay. The ideal pop control setting,
19 was that taking into account the frozen
20 district population, or not?
21 **A   I'm not quite sure what you mean.**
22 Q   In other words, you've set the ideal pop
23 control, and you said it was the population
24 of the state divided by the number of
25 districts.

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1   In making that setting, did you account
2   for the population of the frozen district?
3   **A   We always used the entire state's**
4   **population divided by the number of**
5   **districts.**
6   Q   Okay.
7   MR. STRACH: All right. That's all
8   the questions I have. Thank you,
9   Dr. Mattingly.
10   MS. THEODORE: I may have -- if I can
11   just take ten minutes, I think I'm
12   going to have just a couple of
13   questions.
14   (Whereupon, a recess was taken
15   from 12:04 PM until 12:13 PM.)
16 EXAMINATION BY
17 MS. THEODORE:
18 Q   Dr. Mattingly, I just want to ask you a
19 couple of questions about the treatment of
20 traversal to clarify some things.
21   So I'm going to read you a sentence from
22 Stephenson, and it says:
23   "In counties having a 2000 census
24   population sufficient to support the
25   formation of one non-VRA legislative

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1   district falling out at or within plus
2   or minus 5 percent deviation from the
3   ideal population consistent with one
4   person, one vote requirements, the WCP
5   requires that the physical boundaries
6   of any such non-legislative district
7   not cross or traverse the exterior
8   geographic line of such county."
9   Does that sound familiar to you?
10 **A   Yes.**
11 Q   And does your algorithm take account of
12 traversals in the sense described in what
13 I've just read?
14 **A   Yes, absolutely.**
15 Q   Stephenson then says, next:
16   "When two or more non-VRA
17   legislative districts may be created
18   within a single county, which districts
19   fall at or within plus or minus
20   5 percent deviation from the ideal
21   population consistent with one person,
22   one vote requirements, single member,
23   non-VRA districts shall be formed
24   within said county. Such non-VRA
25   districts shall be compact and should

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1   not traverse the exterior geographic
2   boundary of any such county."
3   Does that the sound familiar to
4   you from Stephenson?
5 **A   Yes.**
6 Q   Does your algorithm ensure that in any
7 single county grouping containing two
8 districts, the two districts do not traverse
9 the exterior geographic boundary of that
10 single county?
11 **A   County grouping.**
12 Q   Let me rephrase.
13 **A   Yes.**
14 Q   Does your algorithm ensure that in any
15 county grouping that contain one county and
16 two districts, that two districts do not
17 traverse the exterior geographic boundary of
18 the county?
19 **A   Yes.**
20 Q   Okay. And then Stephenson says, "Within
21 any such contiguous multicounty groupings,
22 compact districts shall be formed consistent
23 with the at or within plus or minus 5 percent
24 standard whose boundary lines do not cross or
25 traverse the exterior line of the multicounty

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1   grouping."
2   Does that sound familiar to you?
3 **A   Yes.**
4 Q   And does your algorithm ensure that in a
5 continuos multicounty grouping that contains
6 multiple districts, that districts do not
7 cross or traverse the exterior line of the
8 multicounty grouping?
9 **A   Yes.**
10 Q   Okay. And then Stephenson states:
11   "Provided, however, that the
12   resulting interior county lines created
13   by any such groupings may be crossed or
14   traversed in the creation of districts
15   within said multicounty groupings, but
16   only to the extent necessary to comply
17   with the at or within plus or minus
18   5 percent, one person, one vote
19   standard."
20   Do you recall that?
21 **A   Yeah. Could you actually read it again?**
22 **I apologize. That was a lot to take in at**
23 **once.**
24 Q   Sure. And then Stephenson states:
25   "Provided, however, that the

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1   resulting interior county lines created
2   by any such groupings may be crossed or
3   traversed in the creation of districts
4   within said multicounty grouping, but
5   only to the extent necessary to comply
6   with the at or within plus or minus
7   5 percent, one person, one vote
8   standard."
9   Does that the sound familiar?
10 **A   Yes.**
11 Q   Okay. And your algorithm does not
12 create the districts with the grouping,
13 correct?
14 **A   That is correct.**
15 Q   So it doesn't produce or create
16 traversals of interior county lines within a
17 multicounty grouping; is that true?
18 **A   That is true.**
19 Q   Okay. And then I just want to ask one
20 question about -- so what was that --
21 the 2020 paper, what exhibit number was that?
22   Do you recall?
23 **A   This one?**
24 Q   Four. Okay. I'm just going to ask you
25 one question about Exhibit 4.

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1   If you want to flip to Page 27 of that.
2 **A   Page 27?**
3 Q   Yeah.
4 **A   Okay. Yes, ma'am.**
5 Q   Okay. And you see there's a section
6 there called, "Minimizing Traversals",
7 Section 6.1?
8 **A   Yeah.**
9 Q   All right. Does that refresh your
10 recollection that this paper does discuss
11 traversals?
12 **A   Yeah.**
13   MS. THEODORE: Okay. That's all that
14   I have.
15   MR. STRACH: All right. No further
16   questions. Thank you.
17   MS. THEODORE: Thank you.
18   (Whereupon, this examination was
19   concluded at 12:17 PM.)
20
21
22 _____
23 JONATHAN MATTINGLY
24
25

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1 Subscribed and sworn to
   before me on this _____ day
2 of _____, _____.
3
4 _____
   Notary Public
5
6
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25

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1   I N D E X
2 WITNESS: JONATHAN MATTINGLY
3 EXAMINATION BY   PAGE
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6
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11 Exhibit 1   Expert Report of Dr.   13
              Jonathan Mattingly
12
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21
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1   C E R T I F I C A T E
2
3 I, KIARA MILLER,
4 a Shorthand Reporter and Notary Public of the
5 State of New York, do hereby certify:
6
7 That the witness whose examination is
8 hereinbefore set forth, was duly sworn or
9 affirmed by me, and the foregoing transcript is
10 a true record of the testimony given by such
11 witness.
12
13 I further certify that I am not related to any
14 of the parties to this action by blood or
15 marriage, and that I am in no way interested in
16 the outcome of this matter.
17
18   *Kiara Miller*
19 _____
20   KIARA MILLER
21
22
23
24
25

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